

REMARKS

The Office Action mailed October 10, 2006, has been received and reviewed. Claims 1 through 53 are currently pending in the application. Claims 1 through 53 stand rejected. Applicants have cancelled claims 2, 20 and 42, amended claims 1, 3, 4, 15, 16, 19, 21, 31, 32, 33, 37, 41 and 43, and respectfully request reconsideration of the application as amended herein.

35 U.S.C. § 112 Claim Rejections

Claims 1 through 40 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. More specifically, the Examiner cites potential antecedent basis issues in claims 1, 16, 19, 21, 31-33, 37 and 39. Applicants have amended the claims to address any perceived ambiguities and improve antecedent basis.

35 U.S.C. § 102(b) Anticipation Rejections**Anticipation Rejection Based on U.S. Patent No. 429,658 to Stanford**

Claims 1 through 4, 14 through 20, 36 through 43, and 49 through 53 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Stanford (U.S. Patent No. 429,658). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1, 3, 4 and 14 through 18

Independent claim 1 of the presently claimed invention is directed to a fluid flow control device. As amended herein, the fluid flow control device of claim 1 comprises: a valve having a fluid inlet, a fluid outlet and a flow path defined therebetween, the valve further including a valve seat in communication with the flow path and a valve stem disposed within the valve seat and cooperatively configured with the valve seat to cause the valve stem to advance or back off within the valve seat responsive to rotation of the valve stem about a first axis; a gear member

coupled to the valve stem; and a linear positioning member having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the gear member and the valve stem about the first axis upon such displacement of the linear positioning member along the second axis, and *wherein the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear.*

The examiner cites Stanford as disclosing:

[A] fluid flow control system comprising: a controller (i.e., operator that operates the linear positioning member (k)); at least on fluid flow control device (Fig. 1) operably coupled with the controller, the at least one fluid flow control device comprising: a valve having a fluid inlet (a'), a fluid outlet (d) and a flow path defined therebetween, the valve further including a valve seat (near (b)) in communication with the flow path and a valve stem (c') disposed within a valve seat and cooperatively configured with the valve seat to cause the valve stem to advance or back off within the valve seat responsive to rotation of the valve stem about a first axis; a fear member (g) coupled to the valve stem; and a linear positioning member (k) having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the fear member along the second axis. (Office Action, page 3).

Applicants submit, however, that Stanford fails to describe all of the limitations of claim 1 of the presently claimed invention.

Stanford describes a spraying device or nozzle used to atomize liquids. The nozzle includes a body portion (a) defining a passage having a discharge opening (b). A cooperating tapered plug (c) moves relative to the discharge opening to define an annular discharge orifice. The tapered plug is coupled to an extension ring (d) that is threadably coupled with the body portion. Rotation of the extension ring relative to the body portion results in the displacement of the tapered plug. In one embodiment, the extension ring includes teeth (g') formed on an external surface thereof and which mesh with a rack-bar (i)/slide-bar (k). Displacement of the slide-bar results in rotation of the extension ring. (See, e.g., page 1, lines 31 through 95). However,

Stanford clearly fails to describe the rack-bar/slide-bar, or any portion thereof, as being configured as a worm gear. Nor has the Examiner cited any description by Stanford (even though such subject matter was under consideration - as set forth in claim 2 prior to its cancellation herein) of *the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear.*

Applicants, therefore, respectfully submit that claim 1 is clearly not anticipated by Stanford. Applicants further submit that claims 3, 4 and 14 through 18 are allowable over Stanford as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 4, Applicants submit that Stanford does not describe a linear positioning actuator coupled with the linear positioning member and configured to displace the linear positioning member along the second axis.

With respect to claim 14, Applicants submit that Stanford does not describe a worm gear as recited in claim 1, wherein the worm gear is substantially rotationally fixed about the second axis.

With respect to claim 15, Applicants submit that Stanford does not explicitly or inherently describe a valve that is configured to accommodate a fluid flow at a pressure of up to at least approximately 3,000 pounds per square inch.

With respect to claim 16, Applicants submit that Stanford does not explicitly or inherently describe a valve that is configured to have a flow coefficient (C_v) of approximately 0.004.

With respect to claim 17, Applicants submit that Stanford does not explicitly or inherently describe a valve that is configured to maintain a substantially constant flow rate of fluid flowing therethrough at approximately 1 milliliter per minute or less.

Applicants, therefore, respectfully request reconsideration and allowance of claims 1, 3, 4 and 14 through 18.

Claims 19 and 36 through 40

Independent claim 19 is directed to a fluid flow control system. The system of claim 19, as amended herein, comprises: a controller and at least one fluid flow control device operably coupled with the controller. The at least one fluid flow control device comprises: a valve having

a fluid inlet, a fluid outlet and a flow path defined therebetween, the valve further including a valve seat in communication with the flow path and a valve stem disposed within the valve seat and cooperatively configured with the valve seat to cause the valve stem to advance or back off within the valve seat responsive to rotation of the valve stem about a first axis; a gear member coupled to the valve stem; and a linear positioning member having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the gear member and the valve stem about the first axis upon such displacement of the linear positioning member along the second axis, and *wherein the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear.*

The Examiner's reliance on Stanford and the teachings of Stanford are set forth hereinabove with respect to claim 1. Applicants submit that Stanford clearly fails to describe all of the limitations of claim 19. For example, as previously discussed, Stanford fails to describe *the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear.*

Applicants, therefore, submit that claim 19 is clearly allowable over Stanford. Applicants further submit that claims 36 through 40 are also allowable over Stanford as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 36, Applicants submit that Stanford does not explicitly or inherently describe a valve that is configured to accommodate a fluid flow at a pressure of up to at least approximately 3,000 pounds per square inch.

With respect to claim 37, Applicants submit that Stanford does not explicitly or inherently describe a valve that is configured to have a flow coefficient (C_v) of approximately 0.004.

With respect to claim 38, Applicants submit that Stanford does not explicitly or inherently describe a valve that is configured to maintain a substantially constant flow rate of fluid flowing therethrough at approximately 1 milliliter per minute or less.

With respect to claim 39, Applicants submit that Stanford does not describe the worm gear as recited in claim 19, wherein the worm gear is substantially rotationally fixed about the second axis.

Applicants, therefore, respectfully request reconsideration and allowance of claims 19 and 36 through 40.

Claims 41, 43 and 49 through 53

Independent claim 41 of the presently is directed to a method of controlling the flow of a fluid. As amended herein, the method of claim 41 comprises: providing a valve having an inlet, and outlet, a flow path defined between the inlet and the outlet, and a valve seat in communication with the flow path; disposing a valve stem within the valve; coupling the valve stem with a gear member; engaging the gear member with a complementary surface of a linear positioning member; *forming the complementary surface of the linear positioning member as a substantially helically cut worm gear*; flowing the fluid through the flow path; and displacing the linear positioning member along a first axis to rotate the gear member and valve stem about a second axis and displacing the valve stem along the second axis.

The Examiner's reliance on Stanford and the teachings of Stanford are set forth hereinabove with respect to claim 1. Applicants submit that Stanford clearly fails to describe all of the limitations of claim 41. For example, as previously discussed, Stanford clearly fails to describe *forming the complementary surface of the linear positioning member as a substantially helically cut worm gear*.

Applicants, therefore, submit that claim 41 is clearly allowable over Stanford. Applicants further submit that claims 43 and 49 through 53 are also allowable over Stanford as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 43, Applicants submit that Stanford fails to describe substantially restraining the worm gear from rotating about the first axis.

With respect to claim 49, Applicants submit that Stanford fails to describe, either explicitly or inherently, flowing a compressible fluid through the flow path.

With respect to claim 50, Applicants submit that Stanford fails to describe that flowing the fluid through the flow path includes effecting a phase change within the fluid.

With respect to claim 51, Applicants submit that Stanford fails to describe, either explicitly or inherently, flowing the fluid at a substantially constant rate of approximately 1 milliliter per minute or less.

With respect to claim 52, Applicants submit that Stanford fails to describe, either explicitly or inherently, maintaining a pressure of the fluid within approximately 3 pounds per square inch of a predetermined pressure.

Applicants, therefore, respectfully request reconsideration and allowance of claims 41, 43 and 49 through 53.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 429,658 to Stanford as applied to claims 1-4, 14-20, 36-43, 49-53 above, and further in view of U.S. Patent No. 4,759,386 to Grouw, III

Claims 5 through 13, and 31 through 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Stanford (U.S. Patent No. 429,658) as applied to claims 1-4, 14-20, 36-43, 49-53 above, and further in view of Grouw, III (U.S. Patent No. 4,759,386). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 5 through 13, and 31 through 35 are improper because the references relied upon by the Examiner fail to teach or suggest all the limitations of the presently claimed invention.

Claims 5 through 13

Each of claims 5 through 13 depend, ultimately, from independent claim 1. The Examiner relies on Stanford as teaching all of the limitations of claim 1 and then cites Grouw III as disclosing a motor for positioning a linear actuating member associated with a valve. The Examiner concludes that it “would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Stanford a motor for actuating the linear

actuating member for the purpose of accurate automated operation of the member.” (Office Action, page 5).

As previously discussed, Stanford fails to teach or suggest all of the limitations of claim 1. For example, Stanford clearly fails to teach or suggest a linear positioning member having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the gear member and the valve stem about the first axis upon such displacement of the linear positioning member along the second axis, *wherein the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear*. Grouw III clearly fails to remedy this shortcoming of Stanford.

As such, Applicants submit that claims 5 through 13 are allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to the “motor” described by Grouw III, the only specific details provided appear to include the statement that “alternating current from a suitable source... supplies power to a reversible permanent split capacitor motor 28” and that the “[m]otor 28 is typically 115 volts, 60 cycle, 1.14 rpm, with continuous duty 40 inch pounds starting torque.” (Col. 2, lines 26-31). As such, Applicants submit that Stanford and Grouw III fail to teach or suggest various limitations of the claimed actuator.

For example, with respect to claim 5, Applicants submit that Stanford and Grouw III fail to teach or suggest that the linear positioning actuator includes a linear positioning stepper motor.

With respect to claim 7, Applicants submit that Stanford and Grouw III fail to teach or suggest that the linear positioning actuator is configured to receive an electrical input signal in the range of approximately 4 to 20 milliamps.

With respect to claims 8 and 9, Applicants submit that Stanford and Grouw III fail to teach or suggest that the linear positioning actuator includes a direct current power supply.

With respect to claim 9, Applicants submit that Stanford and Grouw III fail to teach or suggest that the direct current power supply includes a transformer configured to be coupled with an alternate current power supply.

Applicants, therefore, respectfully request reconsideration and allowance of claims 5 through 13.

Claims 31 through 35

Each of claims 31 through 35 depend, ultimately, from independent claim 19. The Examiner relies on Stanford as teaching all of the limitations of claim 19 and then cites Grouw III as disclosing a motor for positioning a linear actuating member associated with a valve. The Examiner concludes that it “would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in Stanford a motor for actuating the linear actuating member for the purpose of accurate automated operation of the member.” (Office Action, page 5).

As previously discussed, Stanford fails to teach or suggest all of the limitations of claim 19. For example, Stanford clearly fails to teach or suggest a linear positioning member having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the gear member and the valve stem about the first axis upon such displacement of the linear positioning member along the second axis, *wherein the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear*. Grouw III clearly fails to remedy this shortcoming of Stanford.

As such, Applicants submit that claims 31 through 35 are allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to the “motor” described by Grouw III, the only specific details provided appear to include the statement that “alternating current from a suitable source... supplies power to a reversible permanent split capacitor motor 28” and that the “[m]otor 28 is typically 115 volts, 60 cycle, 1.14 rpm, with continuous duty 40 inch pounds starting torque.” (Col. 2, lines 26-31). As such, Applicants submit that Stanford and Grouw III fail to teach or suggest various limitations of the claimed actuator.

For example, with respect to claim 31, Applicants submit that Stanford and Grouw III fail to teach or suggest that the linear positioning actuator includes a linear positioning stepper motor.

Applicants, therefore, respectfully request reconsideration and allowance of claims 31 through 35.

Obviousness Rejection Based on U.S. Patent No. 429,658 to Stanford as applied to claims 1-4, 14-20, 36-43, 49-53 above, and further in view of U.S. Patent No. 5,129,418 to Shimomura et al.

Claims 21 through 27, and 44 through 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Stanford (U.S. Patent No. 429,658) as applied to claims 1-4, 14-20, 36-43, 49-53 above, and further in view of Shimomura et al. (U.S. Patent No. 5,129,418).

Applicants respectfully traverse this rejection, as hereinafter set forth.

The 35 U.S.C. § 103(a) obviousness rejections of claims 21 through 27, and 44 through 48 are improper because the references relied upon by the Examiner fail to teach or suggest all of the limitations of the presently claimed invention.

Claims 21 through 27

Each of claims 21 through 27 depend, ultimately, from independent claim 19. The Examiner relies on Stanford as teaching all of the limitations of claim 19 and then cites Shimomura as disclosing a P.I.D. controller and sensors connected with the controller for automatically controlling a flow based on sensed parameter values. The Examiner concludes that it “would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the device of Stanford a controller that comprises a P.I.D. controller and/or sensors operably connected to the controller for the purpose of automatically controlling the flow based on desired sensed parameter values.” (Office Action, pages 5-6).

As previously discussed, Stanford fails to teach or suggest all of the limitations of claim 19. For example, Stanford clearly fails to teach or suggest a linear positioning member having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the gear member and the valve stem about the first axis upon such displacement of the linear positioning member along the second axis, *wherein the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear*. Shimomura clearly fails to remedy this shortcoming of Stanford.

As such, Applicants submit that claims 21 through 27 are allowable at least by virtue of their dependency from an allowable base claim. Applicants, therefore, respectfully request reconsideration and allowance of claims 21 through 27.

Claims 44 through 48

Each of claims 44 through 48 depend, ultimately, from independent claim 41. The Examiner relies on Stanford as teaching all of the limitations of claim 41 and then cites Shimomura as disclosing a P.I.D. controller and sensors connected with the controller for automatically controlling a flow based on sensed parameter values. The Examiner concludes that it “would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided in the device of Stanford a controller that comprises a P.I.D. controller and/or sensors operably connected to the controller for the purpose of automatically controlling the flow based on desired sensed parameter values.” (Office Action, pages 5-6).

As previously discussed, Stanford fails to teach or suggest all of the limitations of claim 41. For example, as previously discussed, Stanford fails to teach or suggest *forming the complementary surface of the linear positioning member as a substantially helically cut worm gear*. Shimomura clearly fails to remedy this shortcoming of Stanford.

As such, Applicants submit that claims 44 through 48 are allowable at least by virtue of their dependency from an allowable base claim. Applicants, therefore, respectfully request reconsideration and allowance of claims 44 through 48.

Obviousness Rejection Based on U.S. Patent No. 429,658 to Stanford as applied to claims 1-4, 14-20, 36-43, 49-53 above, and further in view of U.S. Patent No. 6,712,085 to Weissgerber et al.

Claims 28 through 30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Stanford (U.S. Patent No. 429,658) as applied to claims 1-4, 14-20, 36-43, 49-53 above, and further in view of Weissgerber et al. (U.S. Patent No. 6,712,085). Applicants respectfully traverse this rejection, as hereinafter set forth.

The 35 U.S.C. § 103(a) obviousness rejections of claims 28 through 30 are improper because the references relied upon by the Examiner fail to teach or suggest all the limitations of the presently claimed invention.

Each of claims 28 through 30 depend, ultimately, from independent claim 19. The Examiner relies on Stanford as teaching all of the limitations of claim 19 and then cites Weissgerber as disclosing a fluid flow system wherein a pump is operable connected to a controller. The Examiner concludes that it “would have been obvious to one of ordinary skill in

the art at the time the invention was made to have provided in the arrangement of Stanford a pump that is configured to provide a supply of flow through the valve, for the purpose of providing a controlled fluid flow therethrough.” (Office Action, page 6).

As previously discussed, Stanford fails to teach or suggest all of the limitations of claim 19. For example, Stanford clearly fails to teach or suggest a linear positioning member having at least a portion thereof configured to complementarily engage the gear member, wherein the linear positioning member is configured to be displaced along a second axis and cause rotation of the gear member and the valve stem about the first axis upon such displacement of the linear positioning member along the second axis, *wherein the at least a portion of the linear positioning member which is configured to complementarily engage the gear member is configured as a worm gear*. Weissgerber clearly fails to remedy this shortcoming of Stanford.

As such, Applicants submit that claims 28 through 30 are allowable as depending from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 30, Applicants submit that Weissgerber fails to teach or suggest a syringe pump.

Applicants, therefore, respectfully request reconsideration and allowance of claims 28 through 30.

ENTRY OF AMENDMENTS

The amendments to claims 1, 3, 4, 15, 16, 19, 21, 31, 32, 33, 37, 41 and 43 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search.

CONCLUSION

Claims 1, 3 through 19, 21 through 41 and 43 through 53 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, the Examiner is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,

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